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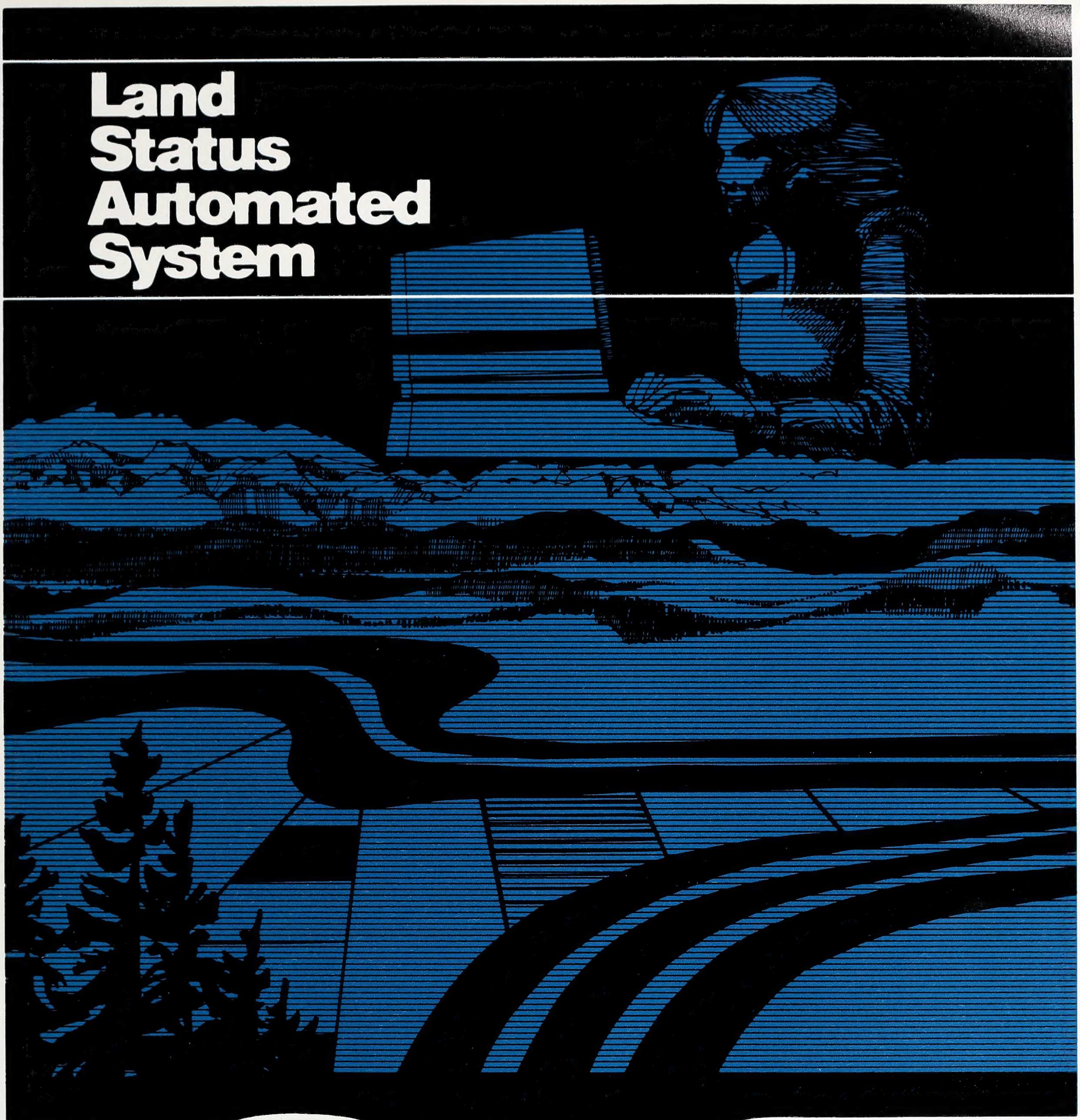
Land Status Automated System



LSAS

Alberta
ENERGY AND
NATURAL RESOURCES

DDN 5433342

Data Conversion

System Development

LSAS Database

System Overview

The Alberta Survey System Explained

LSAS Background

Alberta Energy and Natural Resources is responsible for the administration and management of the province's energy and natural resources; energy, minerals, forests, public lands and fish and wildlife. The administration and management of this resource base has been supported to date by the operation of a quasi-registry system based upon the maintenance of two major record forms: the Surface Township Records and the Mineral Township Records.

Until the advent of LSAS (Land Status Automated System), the method of recording and accessing surface activity data by means of the surface township registers had not changed for over 50 years. This is not true for the sub-surface data where rapid growth in the energy sector prompted the development of an automated system for mineral agreements in 1978. The Mineral Agreements Information System (MAIS) continues to function in parallel with the sub-surface (Mineral) Township registers. LSAS represents a computerization of the textual portion of both surface and sub-surface township registers.

The planning for LSAS has spanned more than a decade. The initial steps were taken in 1973 when the department recognized that there were problems with the existing manual system. It was not until 1978 that a feasibility report was prepared and approved. In October of 1979, the firm of DDC Consulting Services Ltd. began working on the functional analysis. The construction of the system began in April, 1982 with the approval of overall project funding of $6.3 million. It was estimated that the system would require five years for development.

What was initiated in 1973 as a method of "cleaning up" the existing, manually-maintained township records has evolved into the first, department-wide information system with the potential of serving the government community as a whole. LSAS will be the first fully operational automated registry system in Canada.

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The Alberta Survey System Explained

Almost all of the surveying in Alberta has been done on the basis of the Alberta Township System (ATS). Under this system, land was first designated as being West of the 4th Meridian, 5th Meridian or 6th Meridian. These meridians are lines of longitude running north and south through Alberta. The 4th Meridian forms the border between Alberta and Saskatchewan, the 5th Meridian runs through Stony Plain and Calgary, and the 6th Meridian passes through Debolt and Jasper. Between the meridians are columns called Ranges which are numbered consecutively from east to west between each meridian. Townships are rows which cross meridians and ranges. The row adjacent to the U.S. border is called Township 1, the next row north is Township 2, and so on up to Township 126 which is the row adjacent to the Northwest Territories border. The word township is also used to describe the area formed by the intersection of a township with a range; each township is approximately six miles square and contains 36 Sections. The 36 sections within a township are numbered in serpentine-fashion from the southeast corner of the township as shown in figure 1. Each section contains four quarter sections identified by quadrant locations; NE, SE, SW, NW. Each quarter section is approximately one-half mile square.

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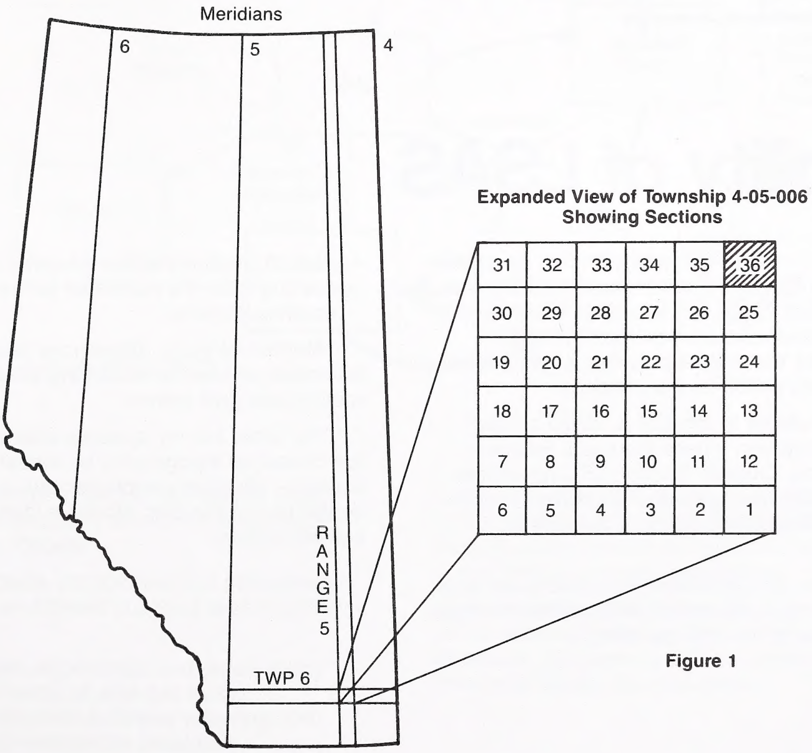
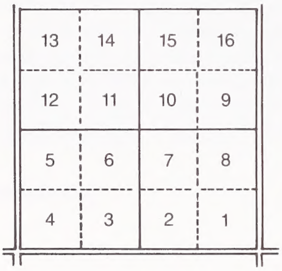


Figure 1

Non-subdivided land is legally described according to its geographical location; that is, meridian, range, township, section and quarter-section. Sometimes there is reference to a Legal Subdivision (LSD), a term referring to a quarter of a quarter section.

The Numbering of Legal Subdivisions within a Section



13	14	15	16
12	11	10	9
5	6	7	8
4	3	2	1

Figure 2

For subdivided land such as in a city, town, village, acreage, or other irregularly-shaped parcels, the ATS legal description is replaced by a legal description determined by a registered plan which assigns a Plan, Block and/or Lot number to each parcel.

Land parcels can be retrieved from LSAS by either -

ATS land identifier (Meridian-Range-Township-Section-Quarter/Section)

or

PBL land identifier (Plan-Block-Lot)

Details on freehold titled land are not provided by LSAS. This data resides with the Land Titles Office.

Flexibility of LSAS

LSAS is built on the ATS land identifier (Meridian-Range-Township-Section-Quarter Section-LSD). The hierarchical nature of this key identifier lends itself to current and future technical development of the system and at the same time provides a geographic orientation for any parcel in the province.

Many of the states in the U.S.A. use a similar rectangular grid system where Meridian, Range, Township, Section, Quarter Section LSD identifiers are used to specify land parcels. The differences between the ATS system and the U.S.A. are as follows:

- References for principal meridians and base lines are measured from different initial points (the base line for Alberta is the 49th parallel).
- The 36 Sections within a township are numbered starting from the northeast corner instead of the southeast corner.

Neither of these differences represents a serious technical problem in modifying LSAS for use with the rectangular grid system.

For other survey systems where parcel identifiers are based on topographic or cadastral data, LSAS could be effectively implemented, as is demonstrated by the use of the plan-block-lot identifier in the current system.

Data Conversion

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System Overview

LSAS is a computerized system which provides access to status information on public land and Crown minerals. Data essential to the management of agreements controlling the use of publicly-owned resources is retrieved and kept current through the use of decentralized terminals. This information is also stored on township registers and in a variety of other manual and automated data systems. LSAS uses powerful data base management software to integrate this data into one central data source which can be shared by all divisions. The basic administrative processes supported by LSAS are shown in figure 3. These include:

- access to land standing information
- data capture and maintenance
- application approval
- disposition review
- statistical and management reporting

LSAS SYSTEM FLOW

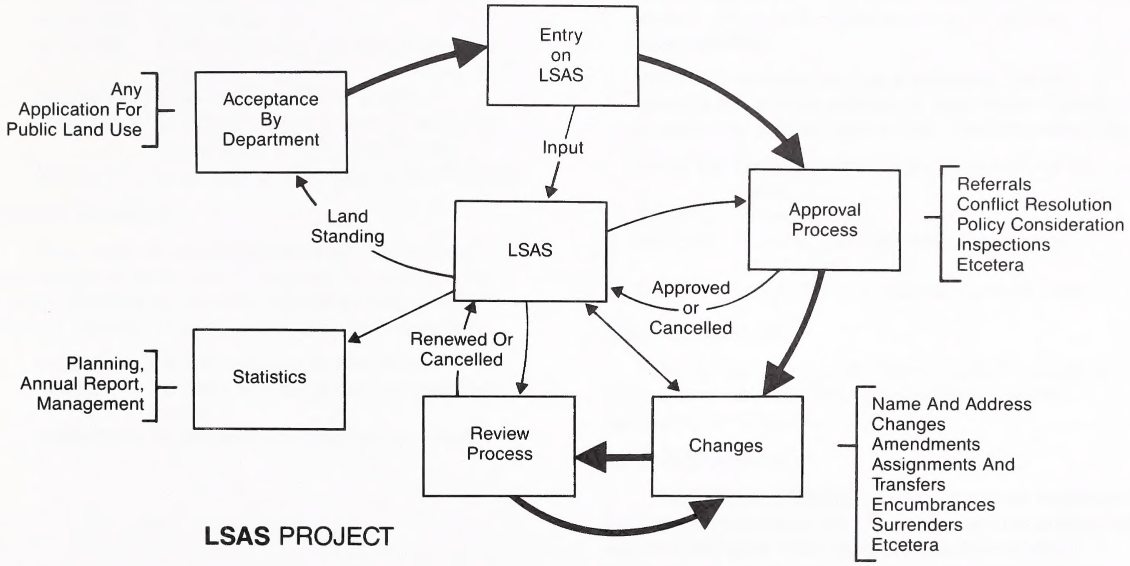


Figure 3

The most important aspect of the overall design of LSAS is the data structure where the major data components are as follows:

- **Client** - all individuals, companies and government agencies having an interest in public land or crown minerals.
- **Activities** - all types of postings and reservations along with agreements, oil and gas sales, encumbrances and other activities affecting both renewable and non-renewable resources.
- **Land** - all townships, sections, quarter sections and LSDs as defined by the ATS structure. In addition, parcels under plan of sub-division, in which the crown has an interest, are defined.
- **Geo-administrative areas** - all land contained within administrative areas are included in the data structure, e.g. regional offices, district offices, Provincial Parks, Special Areas.

Data Conversion System Development

LSAS Database

The database software used by LSAS is the Integrated Database Management System (IDMS). The LSAS database for Releases 1 and 2 is comprised of 45 IDMS records in 17 IDMS areas occupying a total of approximately 800 megabytes of disk storage. These records and their relationships are illustrated in the LSAS Schema Diagram (Figure 4. See reverse). Definitions of the elements and records are contained in the data dictionary. The major components of the structure are:

Activity Details

This includes the following records and their associated text records:

SURFDSP	Surface dispositions;
RESRVTN	Reservation/Notations;
ENCUMB	Encumbrances;
POSTNG	Land Postings;
INTERM	Interim records generated by the conversion project;
GEOADMN	Geo-Administrative areas;
SUBDVSN	Subdivision plans, which are also indexed by subdivision name;
TEXT	single lines of textual remarks data.

Client Details

The client structure contains all names and addresses of each client. Access to a client is by either identifier or generic search on any of the client's names. The following are client records:

CLIENT	all data unique to the client;
NAME	primary and alias names used by the client;
ADDRESS	all addresses used by the client.

Land Details

Two land structures are represented on the data base:

a) ATSLAND represents land referenced by the Alberta Township System identifier. Every township, section, and quarter section has a record occurrence. In addition, legal subdivisons, quadrants, and quarter quadrants are stored as required. The records are stored sequentially through the use of an index on the ATS identifier. IDMS pages are defined with one township per page. Sufficient space is defined for all records in the township to be on the same page;

b) PBLLAND represents land referenced by plan, block, and lot identifier. Every plan number must have a corresponding occurrence of a SUBDVSN record. PBLLAND records are also stored sequentially.

Both land structures share common record formats for storing additional land data. These records are stored on a single multi-member set:

EXCPTN	Exceptional situations identified by code;
CRTITL	Crown titles;
PATENT	Patents (feehold titles) issued by notification;
TEXT	single lines of textual remarks data.

Sun Structure

The Single Universal Network (SUN) structure contains all relationship data between clients, activities, land and transactions.

WIP Structure

The Work in Progress (WIP) structure contains transactions entered on LSAS. These are processed against the data base by a transaction update program after entry is complete and are archived regularly after the transaction has been processed.

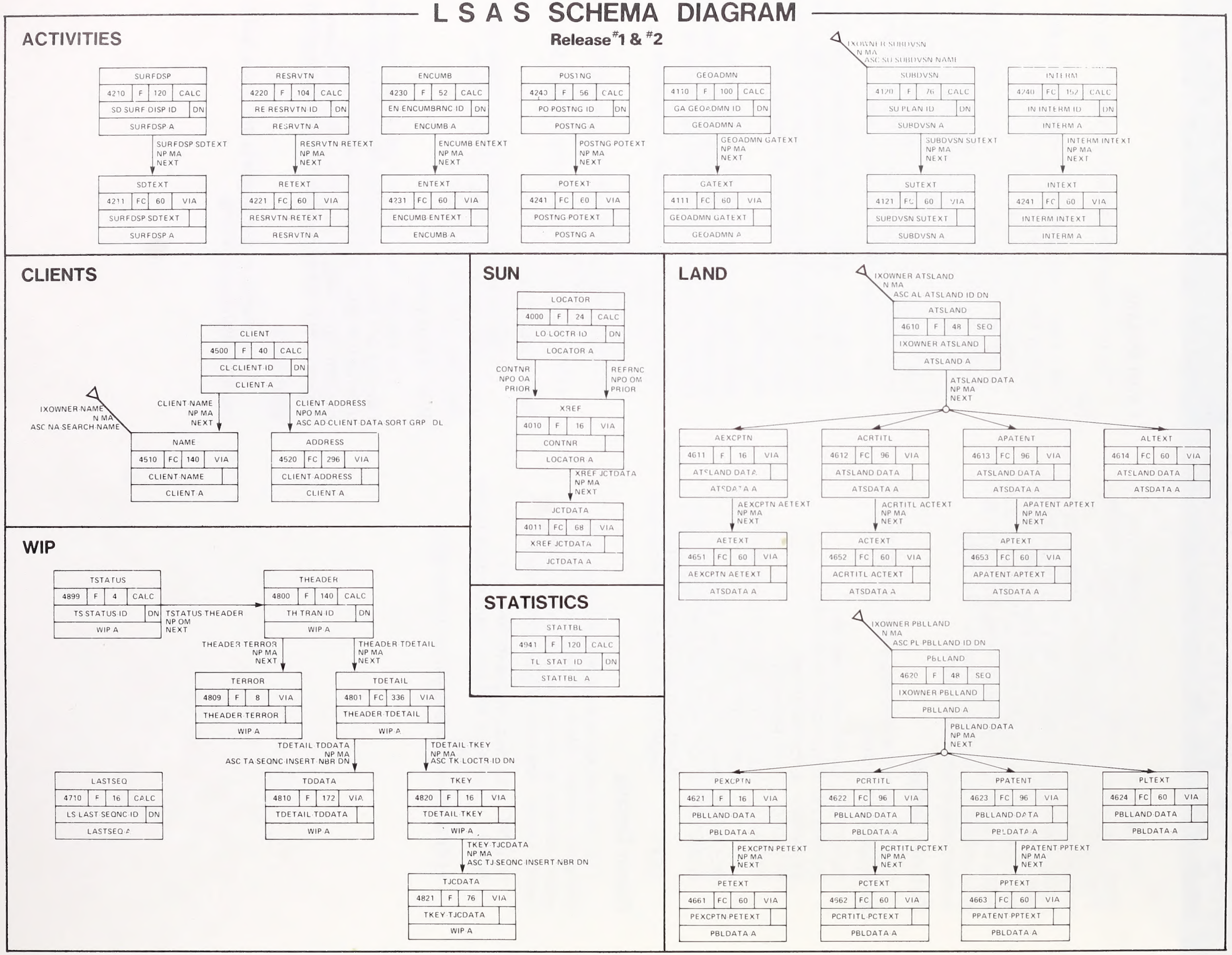
Statistics

The statistics record supports the production of monthly statistics reporting.

Figure 4

L S A S SCHEMA DIAGRAM

Release #1 & #2



Data Conversion System Development

It was decided to develop the system in four separate functional releases because of the size and scope of LSAS coupled with the volume of data which had to be converted. The conversion effort for each release had to take place at the same time as each system release was being developed.

A timeframe of five years for system development is planned with an implementation date of July, 1985 for the final release.

The release concept allowed for a more immediate return on investment, and the opportunity to refine the system on an on-going basis as a result of user feedback in a production environment.

The functions of the system are separated by release in the following manner:

Release #1 - Replacement of Surface Township Registers to provide automated surface land standings and retrieval of surface activity details for head office terminal users. Update facilities are centralized in the Crown Land Registrar's LSAS Operations Group. A number of standard and specialized batch reports were developed to support this release.

Release #2 - The client register which carries name and address data. This release links clients who have common interests in land and provides multiple addresses for various purposes for each client. Retrieval is general, but update of client and all registration data is still limited to central LSAS Operations Group.

Release #3 - Provides administrative support and control for users by means of process control and ad hoc reporting. The process control mechanism facilitates diarizing, referrals and planning of staff work-loads. Ad hoc reporting extracts various combinations of system and process control data to provide a flexible management reporting tool. Update of process control data will be a user responsibility.

Release #4 - Replaces the Mineral Township Registers and provides automated subsurface land standings with details of mineral agreements, oil and gas sales, wells, unit agreements and other defined activities specific to non-renewable resources. Associated client data will also be available.

Current Situation

Implementation of Releases 1 and 2 is complete. Terminals and printers have been installed in the user divisions making the first half of the system fully operational. Application development work is presently underway for Release 3 with a planned implementation of spring, 1985. The requirements definition phase for Release 4 will start in October, 1984. This final release is scheduled for production in December, 1985.

Data Conversion

Conversion of data for the LSAS project required the interpretation and consolidation of data directly from a variety of manual records. Another significant requirement was that data conversion had to coincide with the application development cycle and subsequent system releases.

To meet these requirements each conversion data source was identified and assigned a priority consistent with system releases. This ensured that when application development for each release had been completed, the data required to support the release would be available for system testing and production.

Strategy

To ensure that these requirements were met, all data conversion was directly input through the custom software on a mini-computer. This approach was considered more advantageous than a more traditional approach of manually entering data on input forms and forwarding to a data entry facility. Some advantages of this approach were:

- the ability to merge and sort data before loading the data base.
- the reduction in handling of converted data therefore reducing conversion errors.
- the increased productivity of conversion resources by mechanizing data extraction and automating data edits.
- the training of future system input operators through exposure to an automated conversion system and a requirement to interpret source documentation which would be similar to the production environment.
- the control of data conversion activities within the client department permitting enhanced quality control and turnaround time.

Effort

The conversion of the manual records will require approximately 75 man years of effort. Staffing for conversion began in the spring of 1982 and reached 31 project employees. Conversion activities are expected to be completed in 1986.

Volume

There are five major record types which required conversion. Each type required custom software and manual procedures to address the data conversion process including verification, quality control and data control. The five major record types were:

- **Surface Township Register**
  These registers are bound into 360 ledgers containing disposition information on all quarter sections in the province. Conversion of this record resulted in 621,000 individual records. Conversion of this record was completed in approximately 18 months.
- **Alberta Township Plot Plans**
  Plot plans for each surveyed township in the province were reviewed to extract information on survey status, area, presence of water and to identify whether the parcels within the plots were fractional or non-existent. Conversion resulted in 670,000 records for all surveyed quarter sections and legal subdivisions.
- **Geo-Administrative Areas**
  Parcels contained within administrative areas required definition from various maps and records. Conversion of these records resulted in the definition of 701 geo-administrative areas, requiring 730,000 legal descriptions to define the boundaries.
- **Client Name and Address**
  The Main Accounts Receivable System (MARS) was the major source for client names and addresses. Approximately 15,000 names were examined and reformated to comply with data standards established for LSAS. Additional names and addresses were entered from other files and records.
- **Disposition Files**
  Disposition files documenting the details of a variety of transactions for renewable resources provided a source for collecting information not available from other records. They also provided a means of validating information converted from other records. Approximately 85,000 disposition files representing all disposition types will be reviewed to complete the conversion project. An integral part of the conversion process involves identifying the appropriate client for each activity.

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